Experimental expert system for differential diagnosis of dementia

fell in the Alzheimer's group and rose in the stroke group, with the difference in behavior being highly statistically significant. Thus the response of low-flow areas to acetazolamide differs in Alzheimer's disease patients and in stroke patients, which could be of ultimate significance in the differential diagnosis of the dementias.

Experimental Expert System for Differential Diagnosis of Dementia

Plugge, L.A., Verhey, F.R.J., & Jolles, J.
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Complaints of decreased cognitive functioning occur in a diversity of disorders as well as in normal aging. Memory disorders that are the sequelae of normal aging are difficult to distinguish from cognitive disorders that are precursors of a brain disease, e.g., dementia of the Alzheimer type (DAT). The problem is aggravated by the fact that dementia still has highly controversial definitions. Although the introduction of the *Diagnostic and Statistical Manual of Mental Disorders*, ed III, (DSM-III) in 1980 and the criteria of the NINCDS-ADRDA consensus work group established a more systematic approach, the diagnostic practice was not improved. This is because the differential diagnosis of dementia requires the integration of results from various complex examinations. Clinical experience plays an important role in the expert knowledge on this subject, but differs between experts. This makes the problem at hand an interesting subject for formalization through the use of an expert system.

The expert system EVINCE-1 incorporates internationally accepted standards as described in the DSM-III-R and the report of the NINCDS-ADRDA consensus work group.
A neuropsychiatrist provided the expertise in implementing these standards. This resulted in

a decision tree used by the expert system that reflects the decision procedures used by the neuropsychiatrist.

From the patient records of the Maastricht Memory Clinic 19 patients were identified whose disease was diagnosed by the neuropsychiatrist as some form of dementia with at least a 50% certainty. Ten other patients with various disorders but without dementia were also selected. The neuropsychiatrist rewrote each diagnosis in key words on a form, followed by a certainty percentage ranging from 0 to 100.

The main diagnoses were dementia syndrome (DEM), DAT, multiple infarct dementia (MID), depression, and a residual category. Because the latter category contained too large a variety for meaningful comparison, it was dropped from the statistical analysis. The expert system and the neuropsychiatrist displayed a high level of agreement for the diagnosis of DEM, DAT, and MID, and a reasonable level of agreement for the diagnosis of depression. The results confirm the theory that EVINCE-I is a good replication of neuropsychiatric expertise on the subject matter. Thus the expert system can be used for further investigation of neuropsychiatric knowledge and as a tool in dementia research in which standardized diagnostic procedures are important.

Alzheimer's Disease: Statistical Analysis of CT Data

Leys, D., et al.
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Findings on computed tomography of the brain in 30 patients with early-onset, probable Alzheimer's disease were compared with those in 30 sex- and age-matched controls. The degrees of cerebral atrophy were determined between